## IN THE DRAWINGS

The attached sheets of drawings include changes to Figs. 3, 14 and 15. These sheets, which include Figs. 3, 14 and 15, replace the original sheets including Figs. 3, 14 and 15, respectively.

Attachment: Replacement Sheets (3)

## REMARKS/ARGUMENTS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-5, 7-11 and 26-34 are presently pending in this application, Claims 1-5, 7-11, 26 and 27 having been amended and Claims 28-34 having been newly added by the present amendment.

In the outstanding Office Action, Claims 8 and 9 were rejected under 35 U.S.C. §112, second paragraph, for being indefinite; Claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over Nakatani et al. (U.S. Patent 5,811,574) in view of JP 2-170595 (hereinafter "JP '595"); Claims 1-3 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nakatani et al. in view of JP 3-50372 (hereinafter "JP '372"); and Claims 1 and 4 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kumar (U.S. Patent 5,227,013) in view of Koide et al. (U.S. Patent 5,670,067) and further in view of either JP '595 or JP '372. However, Claims 5, 7, 10, 11, 26 and 27 were indicated as allowed and Claims 8 and 9 were indicated as including allowable subject matter. Applicant acknowledges the indication with appreciation.

First, Applicant acknowledges with appreciation the courtesy of the personal interview granted to Applicant's representative on October 4, 2006. During the interview, Claim 1 was discussed and arguments in support of the claim's patentability were presented. The discussions during the interview are reiterated below.

Claims 1-5, 7-11, 26 and 27 have been amended and Claims 28-34 have been newly added herein. These amendments and additions in the claims are believed to be clearly supported by the original disclosure of the present application, for example, specification, page 7, line 26 to page 8, line 20, page 18, lines 5-14, page 29, lines 2-20, and page 33, lines 5-13, and Fig. 11(H). Therefore, no new matter is believed to be introduced.

With regard to the rejection of Claims 8 and 9 under 35 U.S.C. §112, second paragraph, for depending from canceled Claim 6, it is respectfully submitted that Claim 8 was amended to depend from either Claim 5 or 7 by the Examiner's Amendment in the Notice of Allowability mailed December 5, 2005. Therefore, Claim 8 and its dependent Claim 9 are believed to be in compliance with the requirements of the statute.

Submitted herewith is a separate LETTER SUBMITTING REPLACEMENT DRAWING SHEET(S), submitting for approval changes to Figures 3, 14 and 15. These figures have been amended to correct informalities.

Also, the specification has been amended for clarification. Regarding the paragraph beginning at page 39, line 18, corrections have been made based on the descriptions provided in the rest of the specification, for example, page 28, lines 10-14. Therefore, no new matter is believed to be added. If, however, the Examiner disagrees with any of the above amendments, the Examiner is invited to telephone the undersigned who will be happy to work in a joint effort to derive a mutually satisfactory solution.

Briefly recapitulating, Claim 1 as currently amended is directed to a multilayer printed wiring board manufacturing apparatus. The apparatus includes a processing laser source, a scanning head, an X-Y table, a camera and a control apparatus. The processing laser source emits a laser beam, and the scanning head deflects the laser beam in X-Y directions. The X-Y table holds a multilayer printed wiring board placed thereon, and the multilayer printed wiring board has an interlayer resin insulator and one or more positioning marks. The camera measures positions of the positioning marks covered by the interlayer resin insulator by detecting light reflected by the positioning marks. The control apparatus has an input section, an arithmetic operating section and a memory section. Processing data of the multilayer printed wiring board is input to the input section. The arithmetic operating section corrects the processing data based on the positions of the positioning marks and

generates drive data for controlling the X-Y table and/or the scanning head to apply the laser beam to the multilayer printed wiring board and form a hole in the interlayer resin insulator. The memory section stores the processing data and the drive data. By providing such a control apparatus, the processing data for forming holes in the multilayer printed wiring board is corrected based on the measured position of the positioning mark, and thus a large number of holes can be formed with higher positional accuracy.

Nakatani et al. is directed to an optical processing apparatus. However, Nakatani et al. fails to teach "a camera configured to measure a position of the at least one positioning mark covered by the interlayer resin insulator by detecting light reflected by the at least one positioning mark; and a control apparatus having ... an arithmetic operating section configured to correct the processing data based on the position of the at least one positioning mark and generate drive data for controlling at least one of the X-Y table and the scanning head to apply the laser beam to the multilayer printed wiring board and form a hole in the interlayer resin insulator" as recited in Claim 1 as currently amended. On the other hand, Nakatani et al. merely discusses an optical processing device which adjusts image magnification based on the distances between the mask and lens and between the lens and workpiece, and the device does not measure the position of a positioning mark covered by an interlayer resin layer. In fact, it is believed that this Nakatani et al. device cannot utilize a positioning mark covered by a resin layer, because the measured distance between the workpiece and lens determined by reading such an embedded positioning mark would differ from the distance from the top surface of the workpiece to the lens, and as such the magnification adjustment process of the Nakatani et al. device cannot be performed accurately. Furthermore, according to the process shown in Fig. 4, after determining deviation of reticle image on a test workpiece, the Nakatani et al. apparatus simply displaces the test workpiece by the deviation, unlike the claimed arithmetic operating section which

corrects the processing data itself. For the foregoing reasons, the apparatus of Claim 1 is clearly distinguishable from Nakatani et al.

JP '595 discusses a method of detecting a reference mark. Nevertheless, JP '595 does not teach "a camera configured to measure a position of the at least one positioning mark covered by the interlayer resin insulator by detecting light reflected by the at least one positioning mark" as recited in amended Claim 1. Instead, JP '595 simply describes a detection method of a reference mark in which an image signal is obtained by an X-ray ITV camera, and then the signal is converted to a binary image. Hence, Claim 1 is clearly distinguishable from JP '595.

JP '372 is concerned with a multiplayer printed wiring board, but fails to teach "a camera configured to measure a position of the at least one positioning mark covered by the interlayer resin insulator by detecting light reflected by the at least one positioning mark" as recited in Claim 1. Specifically, JP '372 discusses a multilayer printed wiring board having a reflection body 3 and a recognition mark 2 positioned above the reflection body 3.[1] JP '372 also shows in Figure 2 a detection device having a lighting device 8 and a camera 9. According to JP '372, the reflection body 3 and the recognition mark 2 are made of copper and positioned to overlap with each other. As such, it appears that JP '372 attempts to detect the recognition mark 2 by illuminating only a portion of the reflection body 3 around the recognition mark 2, not by illuminating the recognition mark 2 itself and detecting reflected light. This device therefore requires a light source which does not simultaneously illuminate the recognition mark 2 and reflection body 3, and also precise alignment with the light source and the multilayer printed wiring board, unlike the apparatus of Claim 1 which measures positions of the positioning marks by detecting light reflected by the positioning marks. Hence, Claim 1 is believed to be distinguishable from JP '372.

[1] See JP '372, Figures 1(A)-1(C).

Kumar and Koide et al. are related to a method for forming via holes and an apparatus for cutting a wire, respectively. However, neither Kumar nor Koide et al. teaches "a camera configured to measure a position of the at least one positioning mark covered by the interlayer resin insulator by detecting light reflected by the at least one positioning mark" as recited in amended Claim 1. More specifically, Kumar only discusses a method of forming via holes in a multilayer structure as shown in Figures 1-6, and Koide et al. merely describes a cutting apparatus 2 for automatically cutting a printed wiring on a printed wiring board 1, and the apparatus 2 has a camera unit 72 for identifying a cross mark attached to the printed wiring board 1. However, neither Kumar nor Koide et al. teaches the use of cross marks covered by an interlayer resin layer. Hence, the apparatus of Claim 1 is believed to be clearly distinguishable from Kumar and Koide et al.

Because none of Nakatani et al., JP '595, JP '372, Kumar and Koide et al. discloses the camera as recited in Claim 1, even the combined teachings of these cited references are not believed to render the structure recited in Claim 1 obvious.

Turning now to Claim 4, Claim 4 as currently amended is directed to a multilayer printed wiring board manufacturing method. In this method, one or more positioning marks are formed on a multilayer printed wiring board, one or more interlayer insulating agent layers covering the positioning marks are formed, and a multilayer printed wiring board manufacturing apparatus is provided. The multilayer printed wiring board manufacturing apparatus includes a processing laser source, a camera, an X-Y table and a control apparatus. The processing laser source emits a laser beam, and the scanning head deflects the laser beam in X-Y directions. The camera measures positions of the positioning marks, the X-Y table holds the multilayer printed wiring board, and the control apparatus has an input section to which processing data of the multilayer printed wiring board is input, and an arithmetic operating section which corrects the processing data based on the positions of the positioning

marks. The multilayer printed wiring board having the positioning marks is placed on the X-Y table of the multilayer printed wiring board manufacturing apparatus, the positions of the positioning marks of the multilayer printed wiring board are measured with the camera by detecting light reflected by the positioning marks, the input processing data is corrected based on the positions of the positioning marks, and drive data for driving the scanning head and/or the X-Y table is generated in the arithmetic operating section, the X-Y table and/or the scanning head are controlled based on the drive data, and the laser beam is applied to the multilayer printed wiring board to form a hole in the interlayer insulating agent layer.

As discussed above, Kumar and Koide et al. are directed to a method for forming via holes and a wire cutting process, respectively, and neither Kumar nor Koide et al. teaches "forming at least one positioning mark on a multilayer printed wiring board; forming at least one interlayer insulating agent layer covering the at least one positioning mark; ...measuring the position of the at least one positioning mark of the multilayer printed wiring board with the camera by detecting light reflected by the at least one positioning mark" as recited in Claim 4 as currently amended. On the other hand, Kumar simply discusses a method of forming via holes by laser drilling, and Koide et al. only discusses a wire cutting process involving identifying a cross mark attached to a printed wiring board. Neither of these references teaches covering a positioning mark by an insulating layer. The method of Claim 4 is thus believed to be clearly distinguishable from Kumar and Koide et al.

JP '595 and JP '372 are both related to a method of detecting a reference mark. However, neither JP '595 nor JP '372 teaches "forming at least one positioning mark on a multilayer printed wiring board; forming at least one interlayer insulating agent layer covering the at least one positioning mark; ...measuring the position of the at least one positioning mark of the multilayer printed wiring board with the camera by detecting light reflected by the at least one positioning mark" as recited in Claim 4. More specifically, JP

'595 only describes obtaining an X-ray transmittance image of a multilayer printed wiring board, converting the image to a binary image and identifying a position of a reference mark. JP '372 discusses providing a reference mark over a reflection body, and detecting the reference mark by illuminating a portion of the reflection body around the reference mark, not by illuminating the reference mark. Thus, the method as recited in Claim 4 is believed to be clearly distinguishable from JP '595 and JP '372.

Since none of Kumar, Koide et al., JP '595 and JP '372 discloses the forming and measuring steps as recited in Claim 4, even the combined teachings of these cited references are not believed to render the method recited in Claim 4 obvious.

For the foregoing reasons, Claims 1 and 4 are believed to be allowable. Furthermore, since Claims 2, 3 and 28-34 depend either Claim 1 or 4, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 2, 3 and 28-34 are believed to be allowable as well.

In view of the prior indication of allowable subject matters and in light of the amendments and discussions presented above, Applicant respectfully submits that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

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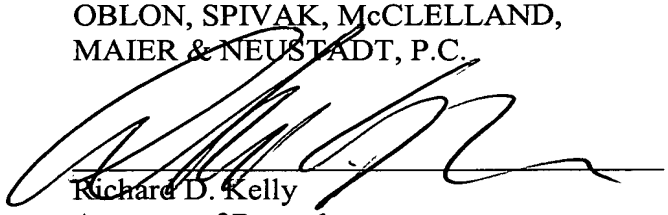

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